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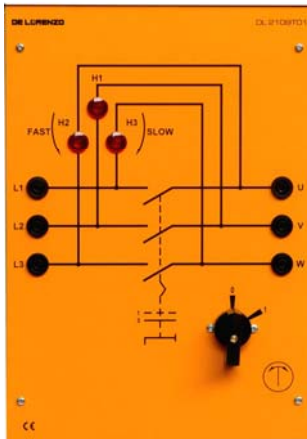
ACCESSORIES

CONNECTING LEADS	TL 2109TM
TWO-LEVEL FRAME	DL 2100-2M
THREE-LEVEL FRAME	DL 2100-3M

ELECTRICAL MEASUREMENTS



Synchronoscope

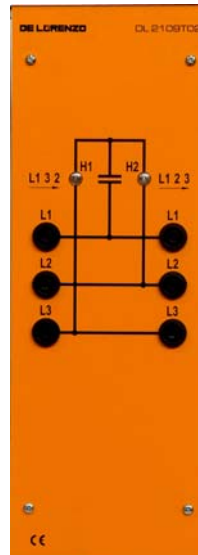


DL 2109T01

Indicator for phase comparison and parallel operation with bright-dark lamps.

Rated voltage:
3 x 380 V/220 V

Phase Sequence Indicator

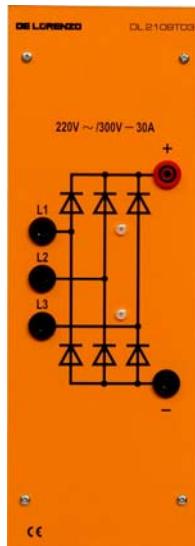


DL 2109T02

Indicator of the phases cycle through signalling lamps.

Rated voltage:
3 x 380 V/220 V

Static Rectifier



DL 2109T03

Three-phase Graetz bridge.
Power supply: 220 Vac
Rectified output:
300 V, 24 A

Variable Resistance



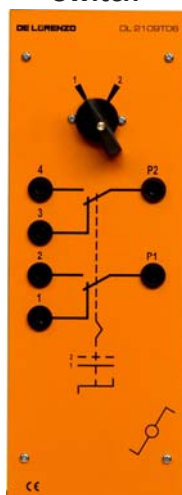
DL 2109T04R

Rheostat, 680 Ω , 0.47 A

ELECTRICAL MEASUREMENTS



Double Change-Over Switch



DL 2109T06

Two pole two-way commutator, 380 V, 16 A.

Micro Ammeter



DL 2109T10

Moving coil, zero centered, with sensitivity reducer.
Range: 50/0/50 μA
Reducer: 1/10
Scale amplitude: 240°

Milliammeter



DL 2109T11

Moving coil with rectifier.
Range: 250/500 mA, DC and AC
Scale amplitude: 240°

Ammeter



DL 2109T12

Moving coil with rectifier.
Range: 2.5/5 A, DC and AC
Scale amplitude: 240°

ELECTRICAL MEASUREMENTS



Voltmeter



DL 2109T14

Moving coil with rectifier.
Range: 25/50 V, DC and
AC
Scale amplitude: 240°

Voltmeter



DL 2109T15

Moving coil with rectifier.
Range: 250/500 V, DC and
AC
Scale amplitude: 240°.

Frequencymeter



DL 2109T16

Moving coil.
Range: from 45 to 65 Hz
Voltage: 250/500 V
Scale amplitude: 240°

Single-phase Wattmeter



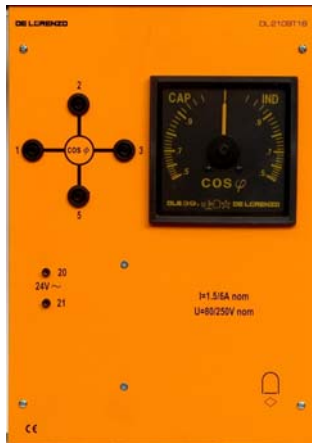
DL 2109T17

Moving coil.
Range:
2.5-5 A / 240-480 V
Scale amplitude: 240°
Power supply: 24 Vac

ELECTRICAL MEASUREMENTS



Single-phase Phasemeter



DL 2109T18

Moving coil meter with transducer for single-phase ac.
Range: 1.5-6 A / 80-250 V
Scale amplitude: 240° x (0.5 cap – 1 – 0.5 ind)
Power supply: 24 Vac

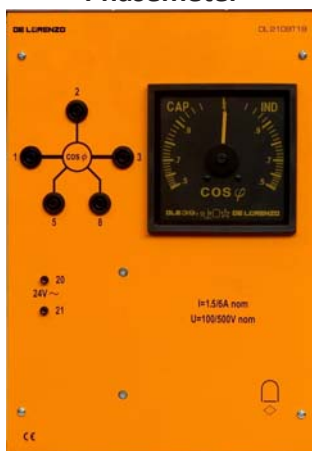
Transformer



DL 2101T13

Primary: 127-220 V
Secondary: 2x12 V
Rated power: 100 VA

Three-phase Phasemeter



DL 2109T19

Moving coil meter with transducer for three-wire three-phase systems with balanced load.
Range: 1.5-6 A / 100-500 V
Scale amplitude: 240° x (0.5 cap – 1 – 0.5 ind)
Power supply: 24 Vac

Resistive Load



DL 1017R

Single or three-phase resistive step-variable load.

Max. power: 3 x 400 W

Max. voltage: 220/380 V Δ / Y

ELECTRICAL MEASUREMENTS



Inductive Load



DL 1017L

Single or three-phase inductive step-variable load.

Max. power: 3 x 300 VAR

Max. voltage: 220/380 V Δ / Y

Capacitive Load



DL 1017C

Single or three-phase capacitive step-variable load.

Max. power: 3 x 275 VAR

Max. voltage: 220/380 V Δ / Y.

Direct Current Motor, Shunt Excitation



DL 1023P

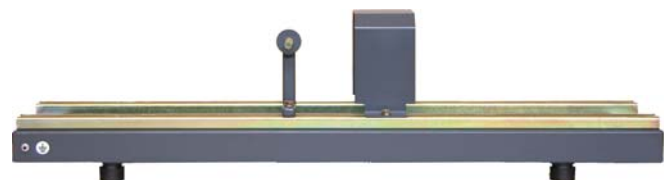
Power: 1.1 kW

Voltage: 220 V

Speed: 3000 rpm

Excitation: 160 V / 0.25 A

Base



DL 1013A

Duralumin alloy varnished structure mounted on anti-vibration rubber feet, provided with slide guides to fix one or two machines and with coupling guard.

ELECTRICAL MEASUREMENTS



Three-phase Synchronous Machine



DL 1026A

Power (alternator): 1.1 kVA
Power (motor): 1 kW
Voltage: 220/380 VD/Y
Current: 2.9/1.7 A D/Y
Speed: 3000 rpm
Excitation: 175 V / 0.4 A

Power Supply



DL 1013M2

Suitable for supplying fixed and variable alternating current and fixed and variable rectified direct current in order to easily carry out all the tests in an electrical measurements laboratory. Complete with start pushbutton with remote control switch, stop pushbutton, key-unlocked emergency mushroom head pushbutton and differential magneto-thermal protection on the mains sockets. Connector for the protection against the overspeed of the motors.

- Variable ac: 3x0-430 V, 5 A and 3x0-240 V, 8 A
- Fixed ac: 3x380 V + N, 16 A and 3x220 V, 8 A
- Standard fixed ac: 220 V, 10 A
- Variable dc: 0-240 V, 10 A and 0-225 V, 1 A
- Fixed dc: 220 V, 10 A

Power supply: three-phase from mains 220 V, 10 A.

Connecting Leads



TL 2109TM

Cable set for connecting modules experimentation DL 2109T.

Framework



DL 2100-2M

DL 2100-3M

Two or three level metal frame for mounting the modules of the laboratory.

ELECTRICAL MEASUREMENTS



SUGGESTED CONFIGURATIONS

Series DL 2109T		DL 2109TM																								
		DL 2109T																								
Electrical Measurements																			Accessories							
Total		1	1	1	1	1	1	1	1	1	1	3	1	3	2	1	1	1	1	1	1	1	1	1	1	1
Experiment		DL 1013M2	DL 1017R	DL 1017L	DL 1017C	DL 2101T13	DL 2109T02	DL 2109T03	DL 2109T04R	DL 2109T06	DL 2109T10	DL 2109T11	DL 2109T12	DL 2109T14	DL 2109T15	DL 2109T17	DL 2109T18	DL 2109T19	DL 2109T01	DL 2109T16	DL 1013A	DL 1023P	DL 1026A	TL 2109TM	DL 2100-2M	DL 1001-1
1	DC current measurement	1	1									1	3											1	1	op.
2	AC current measurement	1	1									1	3											1	1	op.
3	DC voltage measurement	1	1						1					1	3									1	1	op.
4	AC voltage measurement	1	1						1					1	3									1	1	op.
5	OHM's law	1	1						1		1				1									1	1	op.
6	Bridge circuit	1	1					1		1				1										1	1	op.
7	Capacity reactance	1			1							1			1									1	1	op.
8	Power in DC circuits	1											1		1									1	1	op.
9	Power in single-phase circuits	1	1	1	1	1							1		1	1								1	1	op.
10	PF measurement in single-phase circuits	1	1	1	1	1							1		1		1							1	1	op.
11	Inductive reactance	1		1		1							1		1	1								1	1	op.
12	One-wattmeter method	1	1	1	1	1	1		1				1		1	1								1	1	op.
13	Two-wattmeter method	1	1	1	1	1	1		1				1		1	2								1	1	op.
14	PF measurement in three-phase circuits	1	1	1	1	1	1						1		1			1						1	1	op.
15	Four-reading method	1	1	1	1	1	1		1				1		1	2								1	1	op.
16	Six-pulse bridge circuit	1	1					1					2		2									1	1	op.
17	Synchronizing a three-phase alternator	1				1						1	1		3			1	1	1	1	1	1	1	1	op.
		Power supply	Resistive load	Inductive load	Capacitive load	Transformer	Phase sequence indicator	Bridge rectifier	Potentiometer	Double change-over switch	Moving coil microammeter	Moving coil milliammeter	Moving coil ammeter	Moving coil voltmeter	Moving coil voltmeter	Single-phase wattmeter	Single-phase PF meter	Three-phase phasemeter	Synchoscope	Frequencymeter	Base for the machines	Shunt DC motor	Three-phase alternator	Connecting leads	Supporting frame	Workbench

DL 2109T - Set of modules for the study of electrical measurements

DL 2109TM - Set of modules for the study of electrical measurements with alternator

Note

The same DL 2109TM can also be provided in the version of 300 W, 1.1 kW instead of the version suggested by the substitution of the following modules:

REPLACE THE MODULE	WITH THE MODULE
DL 1013M2	DL 30016
DL 2109T04R	DL 2109T04RE
DL 2109T17	DL 2109T17E
DL 2109T18	DL 2109T18E
DL 2109T19	DL 2109T19E
DL 1017R	DL 30040R
DL 1017L	DL 30040L
DL 1017C	DL 30040C
DL 1023P	DL 30220
DL 1026A	DL 30190